



Chamber's Journal

SIXTH SERIES.

DIFFERENT WAYS OF LOOKING AT THINGS.

STAY-AT-HOME people in England are rather apt to get into the way of looking at things from one particular standpoint; and it is only when we go abroad that we find others—and especially those of a different religion to ourselves—who may be most excellent characters and good citizens in every way, taking exactly the opposite view to ourselves. For instance, it is considered a laudable ambition with us for a father to wish that his son should rise in the world and reach a higher social position. But a good Hindu, owing to the caste system, never dreams of making his son in any way different from himself; and if a groom or a farrier, for instance, had twenty sons, they would all be brought up to the father's trade. In the same way, they never dispute the superiority of a man of a higher caste than themselves; and, conversely, a high-caste man never considers it necessary to disguise his contempt for a man of a lower caste.

I remember that once when I was having my lesson in Hindustani from my high-caste *munshi*, whom I employed on first arriving in India, he dilated with great bitterness on the arrogance of Europeans. Presently, wishing to give some orders to my low-caste sweeper about my dogs, I asked the *munshi* to interpret for me, and, among other things, to hand the sweeper two rupees, and to give my directions as to certain purchases. Instead of placing the money in the man's hand, the *munshi* threw it on the ground, and the sweeper quite contentedly gathered up the coins, saluted respectfully, and withdrew. I asked the *munshi* how it was that he, who resented the arrogance of Europeans so much, was so insulting in his behaviour to the poor sweeper; and he explained that the latter quite understood their respective positions, and did not expect a high-caste man to run any risk of touching him, well knowing the penalty of fine and troublesome purification which would be thereby entailed.

On the railways alone, where no provision is made for different castes, does the Brahmin run the risk of encountering such contamination rather than pay the extra charge for a first-class ticket, with which he would probably have little difficulty in getting a compartment to himself. The old story will bear repeating of how a great observer, on observing the following incident, prophesied the breakdown of the caste system by the railways when first opened in India: A Brahmin was standing at the door of a carriage filled with low-caste men, gesticulating and trying to persuade them to leave the compartment, when along came the European guard, anxious to get his train off, and inquired into the cause of dispute. Cutting short the Brahmin's explanation with 'Hang your caste!' or something like it, he pushed him into the carriage, banged the door, and started the train.

In these days of religious controversy, conscientious objections to vaccination, and reluctance to kissing the book, it is refreshing to recall the broad-minded views of John Chinaman on the last-named subject as expressed in the court at Singapore. In that colony natives of southern India generally take an oath by killing a fowl, Chinamen by breaking a saucer, Englishmen on the Testament as at home. Our friend John, however, on being asked how he would be sworn, replied: 'Kill im cock, break im saucer, smell im book—all the same!'

With us it is considered the height of bad breeding to hint in any way that you are tired of the society of a caller, and wish to cut short his visit; but in India when a native calls upon a European he expects to be told when he may go; in fact, he waits till he is told '*Ruksut hai*'—that is, 'You have my permission to withdraw.' Once I had a call from a native doctor, a highly-educated and superior man; but I was not aware of the etiquette on the subject, and the poor man sat on for two hours, looking most uncomfortable, while I wanted to go to attend to various matters; and it was only when my

visitor saw the preparations for my dinner nearly completed that he managed to go away. An officer once called upon a petty rajah, who, assuming a rank above that of his visitor, tried to dismiss him with a '*ruksut*,' when the officer naturally became very angry, and, after giving free utterance to his sentiments, declared his intention of staying as long as he chose.

We are rather proud of the beauty of our wives, and like our friends to admire them; but in India a rich man when travelling, and obliged to let his wives out of the zenana, to prevent any other man seeing them has them carried about, even in the hottest weather, in completely closed sedan-chairs, and with their entire heads and bodies covered with a thick cotton garment, only peep-holes for the eyes being left. If a low-caste Hindu finds his wife given to flirting, he cuts off her nose to render her less attractive; while, until lately, as soon as a Japanese woman got married she had her pretty white teeth blackened with some corrosive preparation of iron, which, however lively she might be, did away with the likelihood of any man wishing to make love to her.

I was once talking to a native in India, who informed me he had two wives. I remarked that they would probably be jealous of each other; and, on his assenting, I asked him how he managed when they quarrelled. He replied without hesitation or embarrassment that he then gave them a real good thrashing. I could not help admiring the virtue of such a method of treatment; for, as 'a fellow-feeling makes us wondrous kind,' the ladies no doubt, when they became companions in misfortune, would feel drawn together and inclined to forget their little differences.

With us a large family is generally considered somewhat of a misfortune, and a man is anxious to save money to leave to his children; but in the East it is still true that 'blessed is the man that hath his quiver full of them.' A man in work will always support not only his parents but all his poor relations. In the vast continent of India, with its teeming population, mostly miserably poor, so that it is considered affluence to be able to afford to eat twice a day—where there are millions who never know what it is not to be hungry—there is no such thing as poor-law relief. One's poorest servants, who live and keep a family on from six to ten shillings a month, always have some poor relations hanging on to them, who lie doing nothing all day, but are always welcome to a share of the scanty dinner when it is ready. Once, talking to a Japanese, I asked him how he would do when he got too old to work; when he pointed with pride to his happy children running about, and intimated that he had sons whose privilege it would be to keep him in his old age. Of course it is well known that in China

this feeling is carried still further, so that the son worships his father. Thus it is of the greatest importance for a Chinaman to have a son to carry out the proper rites for him on his death; he only values his wife if she gives him a son, while daughters are very often cast out to perish at birth, or sold to be brought up to a life of degradation and shame.

An incident once happened showing a curious way of looking at things on the part of several people. A doctor was summoned hurriedly to visit the child of a native soldier in Ceylon. Before he could reach the 'lines' he was met by some one who said he need not go, as the child was dead. Some days afterwards he received an anonymous letter to say that the child had been murdered, and was buried under the hut of its parents, while a mock funeral had been held, and a doll buried in the usual burial-ground. The doctor took the letter to the magistrate, who pooh-pooched the thing, but told his police-sergeant to make some inquiries. This latter official found that a doll had actually been buried; and, on approaching the hut of the parents of the child, surprised an old woman running away with something which, on examination, proved to be the decomposed body of the infant, which she had evidently just extracted from a hole in the floor of the hut. When the matter was thoroughly sifted it was proved that there was a company of strolling jugglers in the place at the time, and that these people were always anxious to get hold of the skull of a first-born son for their tricks and incantations. Now, this child was a first-born son; and when it was likely to die, the parents heard that the jugglers proposed to exhume the body and steal the skull. Instead of invoking the protection of the law, the poor father and mother of the child tried to prevent the mutilation of its body by the subterfuge above described, while the jugglers, in revenge, wrote the anonymous letter in the hope of getting the infant's parents into trouble. The distrust in the power of the law to protect them is very general among the inhabitants of India, and is due partly to the race having lived for many generations under alien and oppressive conquerors, and partly to the corruption and extortions of the subordinate (native) officers of the law at the present time.

Another incident occurs to me as illustrating this point. A friend, an officer in a native regiment, was obliged to march with his sepoy through standing crops during some manœuvres. He observed the owner of the field wringing his hands, and evidently in great distress at the damage done to his corn; he kindly spoke to the man, and told him he could get full compensation for any damage by applying to the proper official. 'Ah, sahib,' said the peasant, 'your men may have done five rupees' worth of damage; but it

will cost me ten rupees in bribes before I can come before the Commissioner Sahib to state my complaint.'

These few anecdotes may serve to show that we must not always think our way of acting and

looking at things is necessarily the only one or the best; and that, before condemning others as uncivilised or ignorant, we must remember that their circumstances and education are very different to ours.

THE SILVER LINING IN THE CLOUD.



HE paused for a moment, holding the bonnet at arm's-length and regarding it critically. The old woman at work at her knitting stopped too, and eyed the girl half-sadly. 'Doesn't seem much improved—does it, Annie, my lamb? The ribbon's terrible stained inside as well as out.'

The girl smiled as she answered, 'Oh, never mind, aunty dear; it will do well enough this dull weather. Besides, who is to care except you and John; and you'll love me no matter how shabby my clothes are?'

The old woman muttered.

'What's that you say, aunty?' The girl's tones had sharpened: there was suspicion in them.

The old woman looked frightened; nevertheless she stood her ground firmly. 'I say men are finicky folk; you never know when you have them. They set a deal o' store by clothes'—

'But not John!—oh, not John! Why, aunty, are you forgetting how long it is since we became engaged? We're almost like old married folk now.'

'Love doesn't always grow warmer through keeping,' sighed the old woman.

'Doesn't it? You cross old woman! You've risen on your wrong side to-day.' And the bonnet was tossed aside, and the young arms thrown lovingly around the wrinkled old throat, and kisses showered on the hard-lined face. 'As if you could possibly know anything about it—you!—an old maid! Oh yes, all very fine—*kept them at a distance*—and, indeed, he would need to have been a brave lad who would have approached you!'

Then the light-hearted mockery left her tones, whilst her face settled to its usual gravity.

'It's true I'm but a poor working-girl, but some day I shall be a lady—and that day's not very far distant now; for lately there's a something come over John—he's not quite the same—seems preoccupied like, and asks what would I do were he to go away—would I follow him, or remain as I am? Follow him! I'd follow him to the ends of the earth and count it no hardship! No, aunty; John's not always to remain a poor doctor's drudge, doing all the hard and uninteresting work—out late at nights and early in the mornings, whilst Dr Spence takes his rest! No, he means to set up for himself; and he'll

earn his due. He has such a way with him, aunty. I saw him once when a lady fainted away at the studio. I never can think how a poor village lad has learned the trick! You'd never imagine but he was gentleman born. I'm trying hard to be like him. I watch the ladies as they come and go—the real ones—and copy their ways. Oh no, aunty, 'tis not *vanity*; 'tis that he may have no cause to feel ashamed of me.'

In spite of herself the old woman laughed, then sighed. 'You're just your mother's image, Annie! But please God your life may be a happier one than hers! Sometimes I wish we were back in the wee cottage again, though we worked hard and money was scarce. I'll never get used to Edinburgh ways, nor living like this cocked up in the skies!'

'It's the long stairs, and my being away so much!' sympathised the girl. 'You fret when you're alone. And we might easily have a better house; but you're so dreadfully stingy—though it's not for yourself, you dear old soul, you save, save, save! And John as would love me though I came to him in rags and with never a penny to my purse!'

Annie Baillie was an orphan, the child of a village girl who died in giving birth to her. The father's name remained obscure—at least to the village folk—for the poor girl had returned home only to die. It was then that the child's aunt came—a plain, hard-featured woman—leaving an excellent post she had held for years as housekeeper to a bachelor gentleman to mother the helpless babe. None save herself ever knew how hard was the fight waged betwixt her love for the dead and the pride of a righteous woman who ever kept herself respectable, ere the sacrifice was made. But memory, working back to dear dead days, conjuring up visions of a golden-haired sister, years her junior, who clung to her skirts as to a mother's, won the day, and from thenceforward the little stranger gained a place in her heart never to lose it.

All the woman's life was dedicated to the child's. From morning till night she slaved, without murmur, that her darling might lack for nothing, doing any job that came to her hand so long as it brought money. There was scarcely a lad in the village boasting a Sunday shirt but owed its purity and glaze to her.

But it was hard work! Not only was the

burden of the child on herself alone, but also that of its old grandfather too; for ever since his daughter's loss the fingers once so nimble at basket-work seemed to lose their cunning. Vain were it to lay before him his materials; he would only gaze stupidly at them, then turn his weary eyes away and stare morbidly into vacancy. For hours at a stretch he would sit thus, uttering no sound save for a chronic asthmatic wheeze which never left him till released by death.

But the child grew and flourished. In all that country-side there was not a prettier maid nor a merrier. An Edinburgh photographer journeying that way espied the girl in all the glory of her budding womanhood, and, keeping her in mind, later offered her a situation in his studio as attendant on his customers. It was accepted. Together, aunt and niece, with their humble effects, removed from the little home which had witnessed so many vicissitudes to take up their abode on the topmost story of a 'common stair' in the picturesque Old Town of Edinburgh, a locality once fashionable, but now gone down in the world, and relegated to humble folk like themselves. How lonely it was at first in the great town after the simple village life, where they were known and esteemed by all! For they knew no friend save one—a poor medical student fighting his way like themselves. He was the son of a small poultry-farmer in their village at home. Boy and girl he and Annie had been together, attending the same school and keeping abreast in their studies, till the boy leapt beyond her by gaining a bursary, which sent him to an Edinburgh school and later to the university.

John Haggart surpassed even his friends' highest anticipations, and not a few who watched his college course predicted the lad would yet make his mark. He had not long to wait for employment. A leading medical practitioner, in whose class he had been, gave him the refusal of an assistantship, which was only too thankfully accepted. Then it was that unspoken thoughts were clothed in words, and Annie Baillie received an offer of marriage—in the future. She was a good girl, and though loving the lad with all the warmth of an affectionate, generous nature, she nevertheless felt it her duty to point out, now that his foot was seemingly firmly planted on the high-road to success, that she was no fit mate for him. But the young man would not listen. Would she blight all his future, he asked, for ideas so purely chimerical? No other woman had ever been in his thoughts, nor ever should! Did she persist in saying him nay, then indeed would life stretch before him a vista of hopelessness. To do him justice, at the time he believed his words; small wonder, then, that Annie should do so also. That was four years ago, and yet John Haggart was still a bachelor; and Annie, as of old, going to and fro at her daily vocation at the photog-

rapher's—with how heavy a heart not even the old relative, whose pride she was, ever guessed, for the girl bravely hid her feelings under a smiling exterior. But the old woman was growing anxious; the young man was earning enough to set up in a modest way, and Annie had no extravagant tastes; indeed, if anything, erred on the side of an over-carefulness.

One day she secured her opportunity. The doctor had called, and—Annie happening to be out—she took advantage of her absence and spoke out what was in her mind. He feigned surprise that she should doubt him, and seemed hurt thereat. His love, he assured her, was warm as ever; only, a doctor's career depending, as it did, so much on external circumstances, he deemed it wiser not to marry until he could set up for himself and maintain an establishment befitting a well-to-do physician; and surely she would be the last to urge him into a position he could not uphold.

The argument seemed to have weight, and the old woman's words forsook her before his greater fluency of speech; but no sooner had he left that humble apartment than the old doubts rose again, and with even greater intensity; and, amid them all, the face of her dead sister, as she saw it in that last sleep, deaf to the wailing of the poor little unwelcome babe. To-night the old dread was with her again as she looked at Annie, for the face in repose had lost its look of youth, and the girl seemed dull and fagged, as with listless fingers she stitched at her bonnet.

It was striking nine from the church tower at the end of the street. If John were coming he would be soon now, and he had written Annie to expect him.

'Is the parlour redd up?' she asked of the girl, who had lapsed into thought.

'Yes.'

'An' the kettle on the hob? Maybe John will fancy a cup of tea this cold night; the wind's gay high.'

'He never takes tea here now, aunty; 'tisn't good for him, he says. But listen!—yes, 'tis John's step!' As she spoke the bell pealed out, and the girl sprang to open the door.

'John!—how wet you are!—such a night!'

'Annie, for goodness' sake shut the door! You'll rouse the whole stair.'

The girl's face fell; a chill was at her heart. Never had he spoken to her so impatiently before. Something must be troubling him. Silently she led the way to the parlour. He halted on the threshold. 'Is the old woman there?' he whispered.

'No; she is in the kitchen.'

'Keep her there, then, Annie—a bit,' he said. 'I've something of importance to speak to you about.'

After all, perhaps she had been mistaken. An opening might have turned up—the long waiting

and the doubts which would come sometimes were maybe to end. She could almost hear her heart beat; her head throbbed and her throat seemed like to burst. She left him a moment and entered the kitchen.

'Leave us alone a bit, aunty,' she said to the old woman. 'John has some news for me.'

'Bless the bairn!' fervently ejaculated the elder woman. 'An' it's to be hoped the news is good.'

But Annie had disappeared. John Haggart still stood by the fireplace, his arm on the chimney-piece. As she came close beside him he turned to her a troubled-looking countenance. The news was not good, then.

'What is it, John?' she whispered. 'Don't be afraid to tell me. Remember the old days when you used to say troubles only wanted telling to become lighter. You said my sympathy helped you. Things have not changed, dear—not with me anyway.'

'Annie, Dr Spence's brother is dead—away down south, you know?'

'Yes?' she whispered.

'He's been ill some time, you know; but they were not prepared for this. The practice is a good one. Dr Spence says he can work it for me. The other fellow there is not popular. My being with Spence gives me a pull over the other. But it is a case of deciding *now* or *never*.'

'And why should there be delay, John? Or is it you feel a country town practice is shelving yourself?'

'Oh no, Annie. I'd only be too glad to step into a ready-made thing like that. It's the conditions. They're hard, Annie—very hard.'

She knew it now. Barbara—Barbara Spence. She had known it all along; but in the hopelessness of despair tried, though vainly, to blind herself to a fact only too apparent. Barbara—the dead doctor's only child—a sentimental, wilful girl, who, on a visit to her uncle, had given—yes, *given* unsought: Annie was sure of that—her heart. It required but a word from John, dropped every now and again, though he was scarce aware of it, to show how matters stood. The poor silly girl remained faithful to her fancy, even though hurried from place to place. Change of scene was of no avail; they had tried all—gay watering-place, Swiss mountain and chalet—and still she fretted and pined. But Annie might triumph still, for John was not dead to all sense of honour, and she could hold him to his word. But then where should they be?—blighted prospects, disappointed hopes, Dr Spence's influence gone, and she the millstone around his neck. Her resolution was taken. As she spoke, it seemed to her she tolled her own death-knell.

'I can guess the conditions, John. But are they so hard to you? Are there no advantages?'

She could not command her countenance; she turned from the flickering jet of gas that he might not see her pain.

After all, he thought, she did not care so very much; he was relieved, yet half-disappointed.

'Of course there's an advantageous side as far as worldly wealth goes—as men count success. But it's not what we pictured, Annie—not like the old days!'

'Oh John!' she wailed, 'be merciful. I cannot bear it!'

'Annie, my poor girl!' and now he was kneeling beside her, as she sat buried in the old arm-chair, her face hidden in its faded chintz. 'It was none of my seeking—nor his—her father. He looked higher—he had other views; but we were thrown together, and she was his idol. There are conditions in the will. She is light, Annie; not a sober girl like you. He feared she might meet, when he was gone, some fellow who would marry her for her money. I—even I—was preferable to that. You see how I'm placed, Annie. It isn't the practice, Annie. I only started with that. It was so hard to tell you. We shan't, probably, land there at all. Loudon Spence talks of the "top of the tree," and all that nonsense. No, Annie, don't turn from me! Say you forgive me, if only in memory of what has gone!'

Her voice sounded strange and unlike her own as she answered him, facing round with drawn, pallid features, and eyes from which all hope and light had fled.

'I can understand it all, John. You are free. And maybe, had not even she come between us, things could never have been as once we imagined. We were both poor and unknown then, but you've grown beyond me; a poor girl can't rise as a man does. I'm just where you left me in those old days, only older and sadder, a poor broken thing with no spirit left in me. We could never have mated; you'd have been ashamed of me. No, no, don't blame yourself, John; it's life—we're of an unlucky stock—poor mother! It's aunt as will feel it hardest; if she'd died last winter, when she'd the bad attack, I could feel thankful now.'

'I'm a brute, Annie—a cruel, heartless brute! But say the word and I'll stand by you for ever.'

'The word, John, must be Go. The hardest word of all—good-bye. It's come to that, and we'd best get it over.'

'I can't, Annie; indeed I can't.'

But she stood up and bravely held out her hand.

'Not like that, Annie. One kiss, dear?'

'No, John; all that is past and done with for ever. You belong to Barbara now. And apart from that, I owe it to myself—to keep still a little self-respect—to feel when the days are dreary and empty, that anyway I haven't got the heart-ache, too, of having parted with all maiden modesty. But I wish, John, you'd treated me fairer. Even in the telling of this you couldn't start fair, but must needs make-believe it was on account of the

business—and stepping into the dead man's shoes. You're overcome now, seeing me like this; but it'll pass, John, it'll pass, and you'll be happier with your Barbara than ever you'd have been with poor Annie.'

She gently pushed him outside the door as she finished speaking, and left him no further chance of justifying himself. Like a felon from the dock he slunk away with downcast head; the girl had risen in his estimation higher than ever she was, even in those old days when his love was at its hottest.

In the kitchen the old woman sat by the fire; as Annie entered she looked up interrogatively. One glance at the girl's face was enough; it needed not the broken words to tell her the end had come. 'It's all over, aunty; I'm a poor forsaken woman, of no account to any one!'

'But all the world to your poor old aunty. God help you, Annie, my bairn! It's a cruel, unjust world. It's the wicked as flourishes in it!'

'We'd best get to bed, aunty. To-morrow's a busy day at the studio.'

Silently they crept away—two forlorn-looking women. Scotch to the backbone, chary of speech and reticent of thought where their hearts were most affected, no other words passed between them that night; only, as the hours slipped by, and even till the dawn broke, the elder woman heard every now and again the girl's pitiful sobbing and low moaning.

It seemed but the wraith of the old Annie who presented herself at the studio next morning. At a glance the photographer saw the bomb had fallen. He had been expecting it for long; it came upon him with no surprise. For the girl, as the years went by and she stood higher in her master's confidence, felt it was but honest she should tell him something of her history and how affairs stood betwixt her and John. Later inquiries made by himself showed him but too plainly how frail was the foundation the poor girl had built her hopes on. Many a day he had pictured the shattering of them, and rehearsed the words he would use to comfort her. And now the day had come, and he could only remain silent. The look of patient suffering on her face was harder to witness in its quiet resignation than would have been open rebellion, and made him dumb too.

The forenoon passed. It had been a busy one, and now came an interval, the hour she usually ate her dinner; but to-day the little basket was forgotten—she had no appetite for food. Instead, she sat idly by the window watching the passers-by on the crowded thoroughfare below. Her heart was no longer with her work; she had no sympathy with the gay butterflies of fashion whom it was her duty to attend to, to arrange artistically or wait patiently beside them

as they gazed at themselves in the glass altering and realtering their locks ere their vanity was satisfied. Once she had enjoyed it, when she was happy herself and full of hope in the future. But that time had passed long since, and now had come a stage when she positively loathed her duties; she was too out of touch with her surroundings to dissemble her feelings, try as she would. She did not hear the door open, nor the photographer's step till he stood beside her; and then with a start she arose, knocking over, with the movement, a vase of greenery. 'I'm very clumsy to-day, sir,' she humbly apologised. 'I don't feel quite myself.'

'You've had bad news, perhaps?' ventured the photographer.

'Ay; the worst.'

'The worst, my girl, has been known sometimes to turn out the best.'

'For the one party, maybe, sir; I'd wish it might be so. But for me—no. I'd built too much on the future, sir; it frightens me now to look ahead. I don't know how the days are to be lived through!'

'Don't think of them, Annie. Try to bear your sufferings nobly. It's half the battle. After the storm there must come a calm. It's too soon to talk of "coming into port" yet; but there's a haven waiting for you any day you choose to seek it—a sure haven, Annie.'

'What sort of a *haven* will that be, sir—the other world?'

'Well, no, Annie; although I hope we are all journeying there. It's the earthly home I allude to. I had not meant to speak so soon—for it's ill work pressing a poor girl when she's down. But by-and-by, Annie, perhaps you'll think it over? You'll find me always the same; and a home ready for the old woman too. It's a bonny wee house, and the train passes handy; almost like the country, Annie; and you'd like tending on the flowers.'

'It's not my loss that I fret after, sir, and the prospect you hold out is a tempting one; and I haven't worked under you these four years and more not to know I may trust your word and you'd treat me fair. It's—well, it's just this way, sir: I'd only be taking a false advantage of your good nature coming to you a poor heart-broke creature with nothing to offer in exchange'—

'The balance will be equal enough, Annie.'

'Oh, no, sir!—a poor feckless creature—a piece of goods you'd best keep clear of, for our family's been none too lucky. I'll bring you no good. I must just pull myself together and ask you to be kind enough to help me to some employment away from here.'

'I'm willing to risk the ill-luck, Annie; I'd risk more than that. And I'll find you employment too for a bit—a poor farmer's wife that wants a "mother's help" to tide her over

a period of delicate health, and to look after the children. You're just the woman for that, Annie. There's nought like witnessing the sufferings of others to lighten our own. The country sights and sounds will do you good, and bodily toil will leave little time for mental. Just put me out of your mind and leave your poor brain alone.'

'I'm grateful, sir—very grateful! And I'll promise to work hard and try to give satisfaction. But to *forget* you, sir—that won't be so easy; kindness such as you've shown does not come every day; only, if I accept the one, it seems but fair'—

'No, no; we'll put that on one side just

now. We'll not court trouble. And I'm not the man to reproach you if, later, you can't see your way to acting as I'd like.'

'You're a good man,' she sobbed—'a very good man! If the world held more of your kind there would be fewer broken-hearted women. There's been dust in my eyes, sir—I've not seen clear. It's true what you said, our troubles are often our blessings in disguise. It's like poor aunty when she had the cataract. The operation was cruel hard; but she sees clearly now—better than she's done this many a day. My cure's a hard one, sir. I'm not through with it yet; but in the distance I see the light—the silver lining to the cloud.'

INKLESS PRINTING: ITS ADVANTAGES AND POSSIBILITIES.



REFERENCE has previously been made in *Chambers's Journal* to the process employed by the Electrical Inkless Printing Syndicate, Brixton, by means of which a print is obtained by electricity on a special chemically-treated paper, the type and machinery being identical with that used in ordinary printing, with the exception of the inking mechanism, which is in this case dispensed with. Although the process has only been before the public for a short time, great interest has been manifested in it by many of the leading journalists and printers throughout the country; and a considerable amount of capital has already been sunk with a view to more extensive developments. Exhibitions of the machinery in operation have been given to the printing trades in London, and have been attended by representatives of the London and provincial newspapers. While it has been claimed by the exhibitors that the results obtained only represented the initial stages, rather than the finality of the process, many of those present agreed that there were great possibilities in the application of electricity to printing purposes. Many misleading statements, however, have been published from time to time regarding the process; and it is proposed in this article to give a brief outline of the methods employed, and to institute a comparison between the new and old modes of printing, from the standpoints of efficiency and economy.

The patents connected with inkless printing were taken out in 1898 by Mr W. Friese-Greene, a well-known inventor, whose name is associated with the biograph and many photographic processes. Although the principle upon which the process depends is by no means new, its application to printing is highly ingenious and decidedly novel. In the main, inkless printing depends

upon the fact—discovered in the early part of the present century—that certain substances are broken up into their constituents by the electric current. For example, if we place the wires from the terminals of a battery in a solution of blue vitriol, a current of electricity will pass through the liquid, and a deposit of metallic copper will make its appearance upon the wire connected with the zinc or negative end of the battery. Under similar circumstances nitrate of silver will yield metallic silver, salts of gold deposit metallic gold, and so on. It is this effect of the electric current which is utilised in electroplating, the article to be coated being connected with the zinc end of the battery and immersed in a solution of the metal it is desired to deposit.

Let us now endeavour to follow the splitting-up of a substance by electricity as applied to printing. If a piece of paper be steeped for a short time in a solution of nitrate of silver, and placed while still damp upon a flat metal plate which is connected to the carbon or positive end of a battery, we shall find that on touching the upper surface of the paper with the wire from the zinc or negative end a black spot will appear. If the wire be drawn along the paper its path will be marked by a black line; and in this way so-called 'electric writing' may be executed. If a coin be taken and pressed down on the paper, and touched for a short time with the wire, a black impression of the coin will be formed; and similarly type or blocks yield an impression. The explanation of these results is simple. Where the wire or type touches the paper an electric current passes from the plate below through the paper, and in its passage splits up the nitrate of silver. A small deposit of metallic silver—as in electroplating—makes its appearance at the surface of the type, but clings to the paper upon which the type

is impressed. No current passes through the portions of the paper where the type is not in actual contact; these portions therefore remain clean, and a sharp black outline of the type or block is consequently formed. The under side of the paper is also unaffected. To those who are only acquainted with silver as the white metal used in coinage, &c., it should be explained that most metals when in a fine state of division are black—hence the black print obtained. The application of this experiment to printing by machinery is not difficult. The inking rollers are removed, the frame containing the type is connected to the negative end of a battery or other source of electricity, and the bed of the machine upon which the paper is placed is connected to the positive wire. The impression is regulated by packing the bed of the machine, where required, with thin lead-foil. An ordinary printing-machine thus modified is all that is requisite for the inkless process.

The principle underlying electrical printing, therefore, depends upon the decomposition of substances by electricity, or what is known as 'electrolysis,' which will always be associated with the great name of Michael Faraday, who was the first to thoroughly investigate the subject. Viewed from a purely scientific standpoint, this application of electrolysis is highly interesting, and quite in keeping with the spirit of progress characteristic of the times. When we consider the commercial aspect of the question, however, the case is somewhat different, and the extent to which the new process is destined to supersede the old depends upon the considerations it is now proposed to discuss.

First and foremost, it may be safely assumed that electrical printing, to be successful, must be at least as cheap as the ordinary method. Whether this will be the case or not depends entirely upon the cost of the paper containing the requisite chemicals. All experiments point to the fact that a considerable quantity of the printing medium must be contained in the paper to yield prints of sufficient intensity; it therefore follows that this ingredient itself must be very cheap in order that the cost of paper may not be materially increased. We have mentioned nitrate of silver as a chemical which gives a black print for experimental purposes; as a commercial competitor to ink this substance would be entirely out of the question. Not only is it far too costly, but after a time it imparts an objectionable colour to the paper. Of the numerous substances tried very few indeed possess the combined qualities of cheapness and the production of a permanent black print without tinting the paper. At present a mixture of certain organic bodies known in photography as 'developers' with alkaline salts is used by the syndicate, the paper to be printed on being soaked in a solution of these substances, or they are incorporated in the pulp of a hand-made

paper. These chemicals yield a satisfactory, and to all appearance permanent, black print. The difficulty of producing a cheap paper, however, does not end with the discovery of suitable materials; for the introduction of these in sufficient quantity in the ordinary operations of a paper-mill presents almost insuperable difficulties; indeed, it is almost safe to assert that a special method of paper-making will have to be devised to meet the requirements of the new process. How these matters will work out from an economic standpoint time and experience alone can show; but unless this portion of the problem can be satisfactorily solved, inkless printing can never receive more than a limited application.

Another difficulty presents itself, however, in addition to the foregoing. In the vast majority of cases, if not in all, it has been found that, whilst a substance may print well when the paper containing it is damp, no satisfactory result has been obtained when perfectly dry. This is only to be expected, as dry paper serves almost completely to stop the passage of an electric current. Whilst the use of damp paper may be allowable for many purposes, it would obviously be a great drawback to the general adoption of inkless printing if a printer were compelled to damp his paper on every occasion he desired to print. If the new process is to compete commercially with ink, a cheap paper which may be printed upon quite dry is an absolute necessity.

Assuming, however, that such a paper will ultimately be forthcoming, what advantages are possessed by the electrical process over the ordinary method of printing? First of all, there would be a considerable saving in the prime cost of machines, which are much simplified when shorn of the inking mechanism. The process, in addition, is extremely clean; the cost of electricity used is no greater than that of the ink required for a given amount of printing; the type is always clean and ready for use, and the wear and tear it undergoes is less than when ink is used. The machinery could be driven at a greater speed, although it still remains to be demonstrated that extremely high speeds would yield dense prints by the electrical process.

Against these advantages we have to consider that inkless printing at present offers no substitute for printing in colours. It is true that brown, red, or blue prints may be obtained electrically from different chemicals, but a paper soaked in one kind yields one class of print only, and to produce two colours on the same paper would require a second soaking. This operation would absorb too much time and labour to be a successful rival to coloured inks; and it would appear, therefore, that the new process could never entirely supplant the old. Further, few printers have sufficient knowledge of electricity to be able to remedy the little breakdowns which are bound to occur even with the most perfect machinery.

And, lastly, evidence should be forthcoming that the prints will not fade, nor the paper show signs of deterioration, after the lapse of a number of years. Where the process, if successfully worked out, could be applied to advantage would be in the printing of newspapers and journals where only one colour is used. Printing-ink, however, is an old and well-tried servant, and printers will be well advised to make sure that the substitute is

equally efficient in all respects before abandoning that which satisfies their present requirements. The Electrical Inkless Printing Syndicate are sparing no expense in their endeavours to bring the process to perfection, and it is quite possible that careful and continuous scientific investigation may overcome the difficulties enumerated, just as, in the past, sustained effort has solved problems of apparently far greater complexity.

POTEEEN-HUNTING IN THE WILD WEST OF IRELAND.



HIS wild west of Ireland is the natural home of 'poteen' or illicit whisky. This is because the loneliness and remoteness of the spots chosen for making it, almost inaccessible through the mountains and bogs save to those who know something about the country, are all in favour of the smugglers escaping detection; whilst its network of mountain-lakes and small running streams affords the necessary cold water for condensing the distilled fumes into spirit during the cooling process. The report of the Commissioners of Inland Revenue for 1896 shows that the number of detections of illicit distillation was 1399—5 in England, 6 in Scotland, and 1388 in Ireland.

Dear beyond any 'Parliament whisky'—by which expression he denotes that sort more usually met with by my gentle reader: that sort, in fine, which has paid the tax imposed by the brutal Saxon Government—is this fiery fluid to the heart of every true peasant son of Connaught—and daughter too, for that matter, for the fair sex, especially if at all up in years, takes its fair share. And, in the interests of truth, it must be added that those who inhabit the coast-counties from Kerry to Donegal inclusive are also fully alive to its seductive merits. Indeed, many doctors (local, of course) will tell you that well-made poteen is better in sickness than the adulterated whisky usually met with in the small public-houses in this region of poverty; for in the Connemara country at any rate the illicit whisky is made of pure malt; though rumour has it that the less particular palate of Donegal, for instance, is satisfied with a fire-water mainly made from molasses, potatoes—ay, sometimes from almost any other rubbish you please.

But to realise all the humour and wild, reckless spirit shown in prosecuting this precarious industry, one should take a hand in attempting to put down the traffic. Poteen-hunting is about as exciting as deer-stalking and fox-hunting combined, and there are great accompanying hardships to be endured. The best time to catch men making it is naturally about Christmas-tide or the New Year, when our northern winters are,

to say the least of it, inclement, and especially so, I think, in the mountainous west of Ireland, where rain seems to be the normal condition of affairs. Tremendous tramps through mountains and bogs (the latter often unsafe), and night trips of ten to twenty miles, with a snatch of sleep in an open boat, often in rain or frost, are generally necessary in order to reach suspected places undetected before dawn. I have seen a boat's crew after rowing in the darkness nearly all night, and striking on and shoving off from, one would think, nearly every submerged rock in the lake, find themselves at dawn near the spot where they first lost their bearings.

To begin with, I should like to give the reader a rough sketch of how the stuff is made: it is always called 'the stuff' in the trade. You first prepare your barrels of wash, or ground malt properly fermented, which you can test as to its fitness for distilling by throwing in a handful of dry oats, and seeing whether they sink or swim in the liquid. These barrels the police occasionally almost walk into, concealed on the islands by burying them nearly up to the top rim, and covering all with a few boards or poles, and with a layer of grass, &c., on the top. You fill your still with wash, and light a fire under it. The still is a huge round tin utensil, riveted and air-tight, with a convex bottom like a black bottle to concentrate the heat of the fire underneath, and narrowing at the neck, into which is fitted (and the joint also made quite air-tight) a worm. Now, a worm, which is worth three or four pounds merely as old copper, is a long pipe (spiral in shape to give as much surface as possible to the cold water outside), through which the fumes driven off by the heat from the confined liquor in the still must pass, and in which they are condensed by the external cold into liquid spirit, which is caught at the end of the pipe in a bucket, as it flows in a constant small stream. If this runs too freely the process is going on more rapidly than it should, and the fire must be lowered accordingly. This worm is submerged in a barrel of water, and a constant supply is necessary to keep the water in the barrel from heating, in which case, of course, the worm would

fail to do its work ; hence running water or a lake is necessary to the distiller. Tin worms flavour the stuff ; copper ones, which are expensive, do not. Once run through the still the liquor is called 'singlings ;' twice run through it is 'doublings,' or has been, as it is called, 'doubled,' and is the completed spirit. It is very raw and powerful, of course, much overproof, and has, especially when taken hot from the still, a very maddening effect. Some will tell you it has perhaps as much to answer for as the frequent intermarriage of cousins, and poverty, and hardship in causing the abnormal number of lunatics in the west of Ireland.

You can get poteen at about ten shillings to twelve shillings a gallon—that is, if you know your way about, and are not caught by the authorities. An idle scoffer once told me that the only two places where you could be really certain to find a drop of the best poteen in Ireland were the priests' house and police-barracks. Its flavour is smoky and indescribable, but not bad. The penalty for being in possession of it, making it, or being found at or near the place where it is being made, owning or having in possession any land or place where it is found, &c., is very heavy—one hundred pounds, which can be mitigated to six pounds, or three months' hard labour in lieu of payment. Also, everything concealing it, found packed with it (much, for instance, would go into Galway hidden in the middle of the loads of turf), or conveying it (as a horse or cart or boat) becomes forfeit, and if not sufficiently valuable to sell is destroyed on the spot. Every subsequent offence doubles the penalty on the previous convictions being proved ; so that a man twice convicted cannot be fined less than twelve pounds ; thrice, twenty-four pounds ; and so on. Consequently the places selected for its illicit manufacture are almost always on common land, little stony, barren islands, and such-like spots, useful to neither man nor beast for any other earthly purpose.

When made, men and women convey it to its destination in kegs containing several gallons each, carrying them on their backs by night across the bogs and through the unfrequented passes in the mountains ; and, in truth, it is wonderful how women can cross the rough country with such loads as are sometimes found on them. They avoid the main roads, a seemingly unnecessary precaution the casual visitor would say who drives mile after mile through wintry, forsaken Connemara without as a rule meeting a human being. Indeed, to realise the general desolation of the greater part of that portion of our empire you must remember the saying of the lady who remarked, when first the telegraph-poles were being put up there, that they would give the country quite a wooded appearance.

The poorest and most reckless of the peasantry

make the poteen, a middleman of some substance usually getting the lion's share of the profits, and paying for the materials and part of the fine that may be incurred ; the risk is borne mainly by those actually engaged in the manufacture, it being almost impossible to reach the real culprit who lures the poor folk into so much trouble.

Now that you know how to make this beverage, let us take a trip (for you, gentle reader, must come too), and see if we can find anything down a huge lake I wot of. It is some thirty miles long to travel, and at places nearly ten miles broad from the shore of one bay to that of the one opposite, and the whole is studded with rocky islands and submerged rocks—a lively place to navigate on a roughish night. These huge sheets of rocks have been perforated and eaten into holes by the water-action of ages, until they present a surface exactly resembling honey-comb. A few ragged cattle are ferried across to pick up a living on one or two islets where here and there grows a little rough grass, and to which the ownership or possession can perhaps be proved ; but the most are either bare rocks, or carry a rough growth of thorns, holly, or brushwood, which makes an excellent screen for concealing a still-fire or barrels of wash whilst fermenting.

We start off about ten or eleven at night, for there are ten miles to row before we get into the smugglers' happy hunting-grounds. The police have dropped out of barracks some time since, one or two at a time to escape any watch set on their movements, in their oldest uniform and any sort of ancient hat their fancy pleases—for the constabulary forage-cap would betray the boat to the smugglers before it got near enough for a dash at them. We have four men to row, a fifth for a change (indeed, we all take our turn at the oar), and a sixth in the bows with boat-hook, to look out for and to ward the boat off sunken rocks—often the place where there is most work of all to be done. Ten miles down, the lake narrows to half a mile and a ferry ; here a watch is often kept, so darkness and muffled oars are our best friends as we drop down, keeping well in mid-channel. A gun fired, or a galloping horseman, or a warning light flared across the water to the smugglers at work would spoil our chance ; and so we have previously told off a couple of police patrols at likely spots on the shore, so as to have a chance of arresting any one giving an alarm, or to intercept escaping poteen-makers, should we drive any ashore.

After searching a couple of bogs, unless we have some fixed destination, or get hopelessly entangled in miles of rocks, it is as well to get a sleep till dawn on some island near or in the boat, when all the police go under the sail, and keep pretty close together to keep warm, if it is freezing. Very little poteen, comparatively speaking, is made in summer.

Suddenly, however, we are on the alert for

a constable on the lookout has seen a suspicious light. It is a common custom in the west to burn a candle in peasants' cottages all night, partly from superstitious motives; and we can see some far off on shore. But the light we now watch is merely a very slight flare now and again. Some one has been stirring up the still-fire under the still, and is causing an occasional flash which can be seen in spite of the old sail, old sacks, or whatever other screen may have been used to hide the firelight. Now we row quickly and quietly up, then make a dash, as the smugglers, seeing or hearing our approach, rush to their boats and row like mad for the nearest shore. We strike into the track of one craft, which has perhaps been delayed by trying to hide a worm by sinking it, and on we go full speed through the rocks, sometimes right over a half-sunken ridge (and this is where real danger comes in), and gain rapidly with our four oars to their two. However, they know the bay, and we don't! Some of us shout and yell to imaginary police on shore to stop the pass, catch them at the point, or anything else we can think of to help to bewilder them, until at last, tired and confused, and possibly half-dazed with sampling the stuff they have been making, overboard they go to try and escape by swimming or wading ashore somewhere in the darkness, and getting off through the scrub. Overboard after them go a couple of the best of the police, with greatcoats, watches, and all on. One of them, who cannot swim, has a bad time, for the depth of water between the rocks is fifteen or twenty feet in places; and, missing the rocks, he is subsequently recovered with the boat-hook, having lost his quarry, who can swim. In the long-run we catch the father in the water; his son, we hear afterwards, was the man who was with him and escaped, and who, after spending most of a bitter January night wet through on a bare rock, went home to a rheumatic fever, which for months was near costing him his life.

Back to the still-fire and apparatus still working we row, and, raking up the fire again, make the singlings into doublings, and pour a little hot whisky (illicit) into the half-drowned smuggler and police, and dry their wet clothes as well as we can on the top of the hot still. No harm results. No arrests are made when men can be made amenable otherwise by summons; and after two more ordinary seizures next day, we row back again with a couple of captured boats or so in our wake, perhaps rowed part of the way back for us by the smugglers themselves. No resistance is offered, as the constabulary are men of splendid physique, and are also known to be armed on this duty. Indeed, in such a sportsman-like spirit do many of the poor peasants themselves take the game that they bear the

police little or no malice if the catch is a fair one; but woe to an informer should a countryside detect him! I have myself known a party of constables storm-bound in their boat, which they could neither leave nor get home, to be supplied with a cold goose and victuals by the very smugglers they came out to catch! Back we go, and I think that unless in the service, gentle reader, you will not go again; once is enough for pleasure merely.

The smoke and glare of the still-fire are usually the immediate cause of detection; and that reminds me that the neatest instance I know of an Irishman evading suspicion for a long time was by an unusually audacious plan. He took a house adjoining a police-barrack, and used an upstairs room as his distillery, knocking a flue into the police chimney. With water handy, and being on the best terms with the party, but naturally with a stand-off, distant manner towards them, he thus got rid of his smoke by their innocent and unsolicited assistance. The fire in a police kitchen in Ireland, you must know, is burning night and day, to warm and feed constant patrols going from and returning to barracks.

The Inland Revenue Department handsomely rewards poteen detections when prosecuted to a conviction, and thus adds an extra inducement to men to be always on the alert in the work.

Goat's-milk, fresh, mixed with poteen, is a highly invigorating beverage; but do not take too much of it! If you take a gun and lie behind rocks in the narrow mouth of a bay which is being searched in the early winter morning by the boat, you can get many a good shot at wild duck, teal, or widgeon, with which the waters teem, taking them as they fly out over your head when put up. In shooting-lodges on the indented Atlantic coast, indeed, you can hear sportsman speak of acres of teal or widgeon, and can see them too; but no cover may be available to get within shot for an ordinary gunner who has no duck-gun or punt. I have known a constable imitate and answer a seal's cry so well as to attract several of them round the boat in the semi-darkness near enough for a shot; but they sink in deep water, so we forbear from pulling the trigger.

Here is a funny poteen story, and then to bed. An Irish legal potentate, then Lord Chief-Justice, was entering his carriage at Galway railway station, and, tripping, dropped his black hand-bag. There followed a crash as of broken bottles, and a colourless fluid, gently trickling along the platform, revealed to the expert nostrils of his guard of honour of the Royal Irish Constabulary, drawn up in line and rigid at the 'present arms,' the unmistakable aroma of poteen. Tableau! What would you do in such a case, gentle reader, were you the police-officer in command?

THE MONTH: SCIENCE AND ARTS.

THE PROGRESS OF SCIENCE.



THE British Association, meeting this year at Dover, have once more marked the world's progress in those matters which are commonly grouped under the word science.

The President, in his opening address, drew an interesting comparison between the state of knowledge as it is now with that of one hundred years ago, and by way of illustration he pictured the town of Dover as it was in 1799, with its unlighted streets and its meagre cross-Channel service of sailing-vessels. He claimed that, although a most rapid advance had been made in the manufacture of weapons of precision, and in explosives, there was a deep undercurrent of influence sapping the very foundations of war, for the touch of science made the whole world kin. Even now arrangements were being made by which the leading academies of the world will, by representatives, meet at intervals to discuss questions in which the learned of all lands are interested, and he thought it probable that this first meeting would be held at Paris in connection with the World's Fair which is to be such a distinguishing feature of the close of the nineteenth century.

WIRELESS TELEGRAPHY.

At a time when the British Association have just been conducting experiments with Marconi's wireless system, and exchanging compliments with France, it is well to remember that as long ago as 1859 a Scotsman, by name James Bowman Lindsay, read a paper entitled 'On Telegraphing without Wires' before that same learned body. His system, it is true, differed from Marconi's, for he made water the conducting medium, and he actually suggested that it might be possible to speak to America by some such means. He conducted several experiments on the Tay and at Liverpool, and seems to have been the first in the field of wireless communication by electrical means.

GLASOGRAPHY.

The above title has been given to a German method of producing designs in transparent colours upon glass, which is said to be cheap and effective and eminently adapted to decorative purposes. It must be confessed that the common methods of imitating stained glass are not successful from an artistic point of view, while their durability is open to question. It is said that by the glasograph process an unlimited number of copies may be produced in one or more colours from any design, simple or elaborate, and that the tints do not lose their brightness through ex-

posure to light or by age. Glass tiles can be manufactured under the same process, and are said to retain their polish under all conditions.

AUTOMOBILES.

Mr Hiram Percy Maxim, writing in *Cassier's Magazine*, says that there are in New York about a hundred motor hansom and coupé cabs in public service, about twenty motor-wagons engaged in the delivery of merchandise, and between thirty and fifty private motor-carriages, usually carrying two passengers. In London it is calculated there are forty motor coupé cabs, and three times the number of private motor-carriages that there are in New York, and about as many motor delivery wagons. Paris has twelve public motor coupé cabs, many motor delivery wagons, and between three and four thousand of all types of motor vehicles. In London, Paris, and New York the public motor-hansoms are propelled by electricity, using electric storage batteries. In New York ninety-five per cent. of the private motor-carriages are so propelled. In Boston steam takes the place of gasoline. For short distances and light loads electricity more than holds its own; steam is found best for heavy weights and long distances; while for high speeds, long distances, and light weights the gasoline engine has proved the best. In America we find the lightest possible machine, carrying two people abreast. In Great Britain and the Continent one carrying four passengers is most common. The horse has long ago become accustomed to the cycle, but when suddenly confronted with a motor on a narrow road frequently attempts to bolt or jump over a hedge if not well held in hand.

STEEL FOR DECORATIVE PURPOSES.

Industrial strikes generally do far more harm than good, and represent a loss to the community which cannot be recovered. But occasionally a strike will lead to the introduction of new processes and methods which prove to be of value. The recent plasterers' strike in this country has, for example, called attention to a method of employing metal fronts to houses, and as a substitute for lath and plaster ceilings, which has already been employed successfully in America. Our consul at Philadelphia expresses the hope, in which all will concur, that this new application of steel will be taken up by manufacturers in our own country.

ARTIFICIAL INDIA-RUBBER.

No natural product has tempted artificial imitation more than india-rubber, and many fortunes have been spent in such enterprises. Rubber

substitutes have, it is true, been produced which have proved of commercial importance, but no artificial substance has yet been made which exhibits the valuable qualities of that obtained from the rubber-tree. The demand for the article has enormously increased since the invention of rubber tires for wheels, to say nothing of the wants of the electrician; hence any new source of supply is of great importance. There is, however, always the hope that the real rubber may some day be produced synthetically in the laboratory; indeed, it has already been prepared in small quantities. Some time ago a hydrocarbon known as isoprene was discovered among the products of the destructive distillation of india-rubber, and later on the same substance was produced from turpentine. It has recently been found that isoprene kept for several years gradually assumes the qualities and appearance of true rubber. Chemists have now to discover a means of effecting the change more quickly, and a great and useful problem will have been solved.

THE MECHANICAL RAT.

Under this title a useful contrivance is described in an American paper, *The Railway Review*. Its purpose is to carry a cord through a sunken pipe or conduit, and it is in reality a tiny auto-car fitted with three rubber-tired wheels, and capable of travelling four hundred yards with one winding up of its mainspring. When started on its mole-like journey it carries its cord to the goal, when a stronger line is pulled through, which in turn is attached to the electric cable which is to find a permanent resting-place in the conduit. The 'rat' is no larger than the animal from which it takes its name, and can be easily carried in the pocket.

SCOTTISH AGATES.

An interesting and useful guide to the collection of Scottish agates, numbering about one thousand, gathered by the late Dr Heddle, St Andrews, now in the Museum of Science and Art, Edinburgh, has been prepared by Mr J. G. Goodchild, curator of the collection of the Geological Survey of Scotland. As the development of agates is scarcely dealt with in text-books of mineralogy, this handbook is of the more importance. Agates, we are told, are found in what were originally vapour cavities in eruptive rocks of andesite composition, the materials of which they are composed being derived from the decomposition of these rocks. Water percolating downward has dissolved their constituents; the nature of the solution is weak, watery, 'or much-diluted jelly, which gradually coagulates, and eventually passes into the solid state as the liquid solvent escapes.' The different films deposited vary according to the nature of the solution. The growth, colouration, and shape of the agate are traced and described. The

chief locality for Scottish agates lies on the north-west side of a line joining Tillicoultry and St Andrews, and coincides with the outcrop of the Old Red Sandstone lava of the Ochils and the Sidlaws. They are also found in the Pentlands, and less commonly in the Cheviots; and the experienced eye can detect at once the quarry from which they come.

POTATO PULP.

A Dutchman, J. Knipers by name, has patented a method of utilising the residues of the manufacture of potato flour. After straining this raw material and separating from it portions of peel and other impurities, it is treated with glycerine and dilute acid. The resulting compound is a gummy, viscous mass, which is carefully dried and reduced to powder. The next operation is to moisten this powder with a certain percentage of water and to press it into blocks, with the help of moulds if desired, the finished product being a homogeneous, wood-like solid with a metallic ring, which can be cut, turned, bored with ease, and will take the finest screw thread. It is believed that the material will conveniently take the place of wood, vulcanite, celluloid, and even metal for many purposes. It is said, moreover, to be an excellent insulator for electrical purposes. The cost at which it can be produced is not stated.

SKIN-GRAFTING.

Among the curiosities of modern surgical science is that of skin-grafting, a most remarkable instance of which was lately referred to by Dr Stewart McGuire in the course of a chemical lecture. Some twelve months ago, the doctor reminded his hearers, he had performed the operation of skin-grafting upon a negro who some time before had lost his leg. The stump of the limb, instead of healing satisfactorily, exhibited a granular surface of about six inches in diameter, and it was determined that the defect should be made good by the operation of grafting. It so happened that at this time a white man had his leg amputated, and advantage was taken of the occurrence to borrow a section of skin from the white leg with which to patch up the black one, in the hope that the white patch would gradually darken. This hope has not been fulfilled, although the operation was perfectly successful, and the negro carries a white tablet which will identify him as long as life lasts. Once again truth is stranger than fiction.

RAISING SUNKEN VESSELS.

The art of the ship-raiser has of late years been brought to great perfection, and much ingenuity has been exercised in the various methods resorted to. A new apparatus has recently been patented in Germany by an engineer of Sonderburg, which depends upon the well-known fact that calcium

carbide will give off acetylene gas when brought into contact with water. The apparatus consists of a series of barrels or drums, each containing a tipping vessel filled with carbide. These drums are attached full of water to the submerged vessel, and a mechanical device causes the water to attack the carbide. By this means gas takes the place of water in the tanks, the liquid being forced out by pressure, and the sunken vessel is thus buoyed up to the surface.

A CURIOUS SALAMANDER.

Under this title is described in *Nature* an animal quite new to science which has recently made its appearance under unusual circumstances at San Marcos, Texas. Near that town the United States Fish Commission have established a station, and, owing to the uncertain rainfall, it was decided to bore an artesian well. Water was reached at a depth of 188 feet, and, to the surprise of the borers, the first rush brought with it a number of crustacea and the salamander in question. The creature is about four inches in length, with rudimentary sightless eyes; the skin is dingy white, and the exposed gills scarlet. It possesses four slender legs and feet, which are described as being startlingly hand-like, and the body terminates in a flattened tail, bearing a fin like that of the eel. The well is bored through limestone, and is believed to communicate with a subterranean lake.

ELECTRIC HEATING AND COOKING.

The possibility of heating houses and cooking by means of the electric current was long ago demonstrated, but the cost of such a convenience is prohibitive unless the current can be produced in a wondrously cheap manner. The system has, however, been adopted at the Carmelite Hospice which is situated on the Canadian side of Niagara River, about two miles distant from the falls, from which source the necessary energy is obtained. At the Hospice about one hundred horse-power is in use, twenty-five per cent. of which is employed for lighting and cooking, while the rest is devoted to heating the lower floor of the building. All good housekeepers must sigh for the cleanliness of such an arrangement: no fires to create dust and dirt, and a kitchen-range without black or smut—a range with a surface of six square feet, any portion of which can be brought to a dull or bright red heat by the action of a switch. Baking and roasting ovens are heated in the same way, and any surplus current goes to raise the temperature in a tank of water containing four hundred gallons.

THE UTILISATION OF SEWAGE SLUDGE.

At the recent Sanitary Congress the manager of the Dalmarnock Sewage Works, Glasgow, read a paper on 'Recent Developments in the Disposal

of Sewage Sludge,' which was of a very sanguine nature. He believes that the day is not distant when the solids extracted from sewage will be recognised by agriculturists as the globe fertiliser. Two years ago farmers would not take it as a gift, and now they are glad to buy it at one shilling a ton. The Dalmarnock Works have booked orders for eight thousand tons since June last, and an offer to take two hundred thousand tons for a period of ten years is now under consideration. The manager of the works stated that he had no hesitation in recommending the Glasgow Corporation to accept any such offer, even at the low price of one shilling to eighteenpence per ton, as he felt confident that in so doing they would finally settle the knotty question of disposing of the Glasgow sludge on the most satisfactory basis yet dreamt of by sewage engineers, chemists, or sanitarians.

POLARIS.

Not the least wonderful thing in modern astronomy is that, by means of the spectroscope, an observer can not only tell whether a distant star is approaching the earth or receding from it, but can calculate the rate at which it is moving. Professor Campbell, of the Lick Observatory, has recently reported that the Pole-star of the northern heavens is approaching the solar system at the rate of $11\frac{1}{2}$ kilometres (about seven miles) per second. He also from his observations deduces the circumstance that the star is not a single body but one of a pair. The companion star is invisible to us, but the two bodies revolve around their common centre of gravity in a period of four days, the orbit in which they move being comparable in size to that of our moon. It is also assumed that there is a third body which exerts an attractive force on the binary system, and that this attraction causes a periodical variation in the rate at which the Pole-star is moving towards us. The observations were made with a Mill's spectroscope in conjunction with the big telescope.

A MOISTENED WARM-AIR GAS-STOVE.

A gas-heating stove has been recently introduced, and described in *The Practical Engineer*, which heats by bringing a continuous supply of fresh air into a room, removing the vitiated air, and practically renewing the atmosphere in a room hourly. This removes the objection to gas-heating, which uses up the atmosphere and makes the air too dry for health. At the same time, by an ingenious arrangement for moistening, the moisture required by the air to render it suitable to breathe at the higher temperature is automatically introduced, and a uniform temperature is maintained in every part of the room, the parts farthest from the stove being quite as warm as those in close proximity to it. These advantages are effected by about a dozen

one and one-half inch or two-inch wrought-iron air-tubes being fixed vertically behind the gas-heated asbestos fire, connected to a tube plate at the top and bottom of the stove. The bottom of the stove below the bunsen burner constitutes an air-chamber connected with the outside air, either by a duct or by an opening in the floor under the stove, made by removing one or two tiles where the hearth is tiled, and air can be obtained from underneath the floor. When the stove is lit, as the tubes become heated by the bunsen flame and incandescent asbestos shells, the air in the upper portions of the tubes is rarefied and rises to the upper part of the room, diffusing itself along the ceiling and walls. A rapid warm-air current is thus set up from the stove, the fresh air from outside as it becomes heated entering the room and removing by displacement the vitiated air, which is continually escaping up the ordinary chimney. This stove, which is known as the Langfield Moist-air Heating Stove, brought out by Langfield & Co., Blackfriars Street, Manchester, cannot work where there is no provision for ventilation such as an ordinary fireplace.

OMNIA SANITAS!

Was it Lord Beaconsfield who, as Mr Disraeli, was once twitted with being the exponent of a 'policy of sewage'? According to Sir William Preece, no loftier subject can occupy the attention of man; and, according to him also, an ancestor of the great premier—Moses, to wit—was 'the greatest sanitary engineer the world had ever known,' and the Book of Leviticus was 'a treatise on hygiene.' The Jew was the healthiest and longest-lived type of humanity, and the doctrines of Moses could be summed up as the objects of sanitation to-day—namely (1) pure air, (2) pure water, (3) pure food, (4) pure soil, (5) pure dwellings, and (6) pure bodies. Pure air, he said, was to be found in lunatic asylums, jails, and workhouses; but not in our churches, theatres, railway carriages, or dining-rooms—even the dining-room of your 'dearest friend.' Sir William started what will be regarded as a rank heresy by many when he stated that it was a 'moot question' whether absolutely pure water was healthy, and that good drinking-water might contain as many as twenty bacteria per cubic centimetre; that five thousand tumblers of London water contained only one grain of solid matter, and the Thames valley ought to be able to supply London with excellent drinking water for the next fifty years—even with its present works. This is good news for London; but what will the London County Council and the Royal Commissioners say on the subject? Sir William advocates an 'auxiliary supply,' in the shape of sea-water, for street-watering and such purposes. But sea-water is said to be bad for roads and still worse for horses' feet, and its use is said to have been discontinued

even in seaside towns for this reason. For baths, however, it would be invaluable. Pure soil was not so easy a subject as it looked, and we had not got much beyond the experimental stage in this respect, although astonishing effects had been produced by the natural process of bacteriolysis. In regard to pure dwellings, the legislation of recent years had had a beneficial influence on the community by clearing away slums, building well-designed houses, and constructing new streets; and Sir William instanced the case of Edinburgh, which, by spending £560,000 in improving the housing of the poor, had brought down the death-rate from twenty-eight to seventeen per thousand. Electricity was to be the great regenerator of the future. Introduced into our houses, it was to purify the air and save our books, pictures, and curtains from deterioration; albeit there are many people who consider that curtains are a leading factor in insanitariness! It was to be a valuable aid in securing the much desiderated auxiliary supply of water, and it had already demonstrated its value as a sewage disposer in the Hermitte process, which had been introduced at Ipswich and in Netley Hospital. But above and beyond all, it was destined to extend the 'allotted span' of life from the Psalmist's 'threescore years and ten' to fivescore, and, in fact, to bring about a kind of millennium, in which everybody should be healthy, wealthy, and wise. In a word, as the *Times* remarked in a leading article on Sir William's address to the members of the Sanitary Institute at Southampton, 'there is nothing like leather.'

THE MALARIAL MOSQUITO.

As already indicated in the article, 'Mosquitoes and the Spread of Disease,' in this *Journal* for October, there seems no longer any doubt that malarial fever is transmitted by the agency of mosquitoes. Major Ross, writing to the secretary of the Liverpool School of Tropical Diseases, states that an outbreak of fever in the 3rd West India Regiment has been traced to the insect, a large species of *Anopheles*, and in the bodies of these insects the malarial germs have been actually found. Those who wish to acquaint themselves with the method of mosquito life, and the remedial methods which may be adopted to mitigate the pest, are referred by Miss Ormerod to the paper published a few years ago by Dr Howard, entomologist to the American Agricultural Department, an important part of which is the enumeration of the measures which may be taken to check the propagation of the insect. Infestation may arise from deficient sewage and sanitation arrangements. Kerosene will kill the mosquito on a small scale; but, dealing more broadly with the difficulty, the introduction of fish into fishless ponds is a better remedy. Fresh or brackish lakes and ponds near the coast should have canals in communication with the sea, so

that the water may become salt—salt water being fatal to the mosquito. The *Times* suggests that the destructive effects of the tsetse fly on horses may be due to some similar parasite.

RAILWAY SPEEDS.

Since the mad 'race to Aberdeen' of 1896, the English and Scottish railways have quietly settled down to a steady pace of something between fifty and fifty-two miles an hour. There are one or two short lines, such as that from Dorchester to Wareham, where a speed of sixty miles is attained, and from Forfar to Perth, where fifty-nine miles is the scheduled speed. But, generally speaking, anything over fifty-two miles is quite exceptional, and is only maintained for comparatively short distances. While England has been lagging behind somewhat, other countries have been forging ahead, and one is not surprised to hear that America claims to have the 'fastest regular train in the world.' But it is not a little surprising that this claim should be disputed by France, which only a few years ago was far behind our own country in the matter of fast trains. Mr W. M. Acworth, the great railway expert, writing from Denver, Colorado, describes a journey he made recently on the Philadelphia and Reading Railroad to Atlantic City, in which the 'fastest mile' was run at the rate of eighty-one and seven-eighths miles per hour, and the average was over seventy-eight miles an hour! Atlantic City is the Brighton of Philadelphia, and Mr Acworth contrasts this performance with the sorry performance of our Brighton company, with its one Sunday express, Victoria to Brighton, fifty-one miles in sixty minutes, and its single week-day express, London Bridge to Brighton, fifty and one-half miles in sixty-five minutes. The American Empire State Express performs part of the journey from New York to Buffalo at a speed of fifty-seven and one-tenth miles an hour, the inclusive speed for the whole journey being fifty-three and three-tenths miles an hour. Against this the French claim that their Luxe Facultatif train from Paris, by way of Amiens, to Calais Pier, runs between Paris and Amiens at sixty and five-tenths miles an hour, and between Amiens and Calais at fifty-seven and three-tenths miles an hour, the inclusive speed for the whole journey being fifty-seven miles an hour. The highest speed attained on the local express between Paris and Bordeaux is fifty-eight and one-tenth miles an hour, and the inclusive speed fifty-four and two-tenths miles an hour. Against these our Scotch expresses cut but a poor figure, that by the East Coast only reaching a maximum of fifty-four and five-tenths miles an hour (between Grantham and York), and an inclusive speed of fifty and seven-tenths miles an hour. There is one consolation, however, that for long-distance runs—that is, 'breaks' of one hundred miles and upwards—England still holds the record, the system

of 'pick-up' water-troughs enabling the journey between Paddington and Exeter of one hundred and ninety-four miles to be performed without a stop. This is the longest run in the world; but it is closely approached by the North-western Company's American Liner Express, which performs the one hundred and ninety-three and a half miles between Euston and Edgehill, *via* Runcorn Bridge, in three hours forty-five minutes, or a speed of fifty-one and sixth-tenths miles an hour. On the whole, the English speed suits the English people best, although one is surprised to hear that the French have made such strides in recent years.

DESOLATION.

NIGHT, like a pall, with stealthy speed,
Throws o'er the land its sombre frown;
Each darkening glen grows dark indeed,
And wind-blown rain comes beating down.

Gray mists, like shadowy phantoms, trail
Through ev'ry lone and eerie spot;
While ghostly voices moan and wail
Around the shepherd's lonely cot.

Along the wild and wasted shore
A howling gale sweeps fiercely by;
The waves leap in with denfening roar,
And looming storm-clouds fill the sky.

'Mid grim, dark woods, grown desolate,
The last leaves fly before the blast.
Decay and ruin reign elate,
And winter claims the land at last.

SAM WOOD.

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